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LAGEOS LASER RANGING EARTH ROTATION

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Final Report for
April 1, 1991 – September 30, 1992
Contract N00600-91-C-0920
United States Naval Observatory

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INTRODUCTION

This report summarizes the progress made under USNO funding by the University of Texas Center for Space Research on the topic of rapid service operational production of Earth orientation and rotation parameters. The contract N00600-91-C-0920 for the period April 1, 1991, through September 30, 1992, was a follow-on to contract N00600-88-C-1064, which covered the period from April 1, 1988, through March 31, 1991.

SCIENTIFIC PURPOSE AND RESULTS

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The purpose of this grant was to support the production of weekly rapid service Earth orientation using satellite laser ranging (SLR) observations to Lageos. On each Tuesday during the grant period, a solution was performed using data acquired the previous week, and reported through electronic mail to the U.S. Naval Observatory for incorporation into the USNO/International Earth Rotation Service (IERS) Bulletins A and B. Both polar motion and UT1 were adjusted from the Lageos observations, with the UT1 product using long period information from the IRIS VLBI solutions that lag the SLR results typically by 2 to 3 weeks. The SLR product supported by this grant was the most up-to-date observation of polar motion available from any technique.

Solutions were reported by the Wednesday, 0^h UT deadline each week during the period of the grant. Estimates of the accuracy of each 3-day polar motion solution were in the range of 0.4 mas,

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and 0.04 ms for UT1, and these solutions received typically about 50% of the weight in the combined multi-technique solution. Significant users of Bulletins A and B include the armed services of the United States, the NASA Deep Space Network, and numerous users of the Global Positioning System. Results documenting the use of this product can be obtained from the USNO/IERS Bulletins A and B for the appropriate period and from other publications by those organizations. Presentations discussing the results produced under funding from this grant at international conferences include McCarthy et al. [1992], Watkins and Eanes [1991], and Watkins et al., [1992].

CONCLUSIONS

Lageos laser ranges were successfully used to maintain a weekly operational Earth orientation rapid service with submilliarcsecond accuracies in both polar motion and UT1. Reports were provided for each week during the contracting period, and results were reported at international scientific conferences.

ACKNOWLEDGEMENTS

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